Chapter 3. ALTERNATIVE ILLUSTRATIVE PROGRESS GOALS AND CONTROL STRATEGIES

3.1 Alternative Illustrative Progress Goals

The establishment of alternative illustrative progress goals in an ideal setting is a multi-step process. The first step is the specification and evaluation of alternative visibility progress indexes and progress levels. The next step is an assessment of costs to achieve the various indexes and progress levels. The following step is a "mapping" out of the set of least-cost progress goals. It is from this set of goals that the cost-benefit analysis should be developed.

In the case of the regional haze (RH) rule, one visibility index, the deciview, was selected for analysis. The deciview metric expresses uniform changes in haziness in terms of common increments across a range of visibility conditions. These conditions range from pristine to extremely hazy conditions. Measuring changes for other aesthetic effects use analogous scales. In the case of sound, the decibel scale is used. Like the decibel scale, the deciview provides a useful means of expressing changes in visibility due to changes in air quality while providing a scale that relates the aesthetic effect, visibility, to perception.

There is also an averaging time dimension associated with the deciview index as applied in this analysis. For any Class I area, visibility levels are not constant throughout the year. In fact, there are times when natural background visibility conditions may be observed. And, there are other times when anthropogenic visibility impairment is quite pronounced. The averaging time dimension of the index accounts for this variability in visibility levels.

All of the progress goals analyzed in the Regulatory Impact Analysis (RIA) are expressed in terms of improving long-term visibility on the average of the 20-percent worst visibility days each year. However, the air quality modeling used in this RIA provide estimates of annual deciview changes. But, knowing the distribution of visibility levels over the year, one can predict what an annual average deciview improvement will mean in terms of the average of the 20-percent worst visibility days of the year. Such relationships are considered in designing control strategies to improve visibility on the average of the 20-percent worst visibility days each year.

The deciview index and averaging time are only two of the three factors which make up an alternative illustrative goal for this final RIA. The other factor which is determined by a State is when the goal should be achieved.

The four illustrative goals assessed in this analysis are described in terms of those factors. Two of the illustrative goals specify deciview changes in absolute terms. The other two specify deciview changes in relative terms.

3.1 The Two Absolute Illustrative Goals

3.1.1 Goal 1: 1.0 Deciview Improvement in 15 Years.

This illustrative goal is the least stringent of the four analyzed in the final RIA. The goal calls for a one deciview improvement on the average of the 20-percent worst days of the year. Furthermore, that progress to be achieved in 15 years. However, the end of the first long-term strategy period in the rule is 10 years from the date the EPA expects the visibility progress goals to be established. Furthermore, the RIA uses a year, 2015, which is near the end of that 10-year period, as a basis for comparing all of the illustrative goals. To account for that fact, a deciview improvement of 0.67 (i.e. 10 years/15 years x 1.0 deciviews) is assumed to be an appropriate portrayal of the expected progress from this illustrative goal near the end of the first long-term strategy period.

The shorthand description of this illustrative goal is "**1.0 dv/ 15 years**."

3.1.2 Goal 2: 1.0 Deciview Improvement in 10 Years

For some regions of the country, this is the next to the least stringent illustrative goal. This goal also calls for a 1.0 deciview improvement on the average of the 20-percent worst days of the year. However, the goal is achieved more quickly than the goal 1. Specifically, goal 2 should be achieved by the end of the first long-term strategy period. As noted previously, this is 10 years from establishment of the progress goal and development of implementation plans to meet the goal.

The shorthand description of this illustrative goal is "**1.0 dv/10 years**."

3.2 The Two Relative Illustrative Goals

In response to public comment, the scope of the RIA was expanded to include two relative progress goals.

3.2.1 Goal 3: 5% Deciview Improvement in 10 Years

Goal 3 is also focused on the average of the 20-percent worst days. The goal should be achieved by the end of the first long-term strategy period.

For some regions of the country, the 5% deciview improvement in 10 year goal is the next to the least stringent illustrative goal. For other regions of the country, it is the next to the most stringent. This difference in relative stringency results because of the varying baseline visibility conditions throughout the country. For instance, if the benchmark visibility condition for one region were 18 deciviews, a
5% improvement would be 0.9 deciviews. But, if the benchmark condition for another region were 25 deciviews, a 5% improvement would be 1.25 deciviews. In the first example, the 5% deciview improvement in 10 years is less stringent than goal 2. In the second example, the 5% deciview improvement in 10 years is more stringent than goal 2.

The shorthand description of this goal is "**5% dv/10 years**."

3.2.2 Goal 4: 10% Deciview Improvement in 10 Years

Goal 4 is also focused on the average of the 20-percent worst visibility days. The 10% improvement in benchmark visibility conditions is to be achieved by the end of the first long term strategy period. According to the RH rule, this goal is to be evaluated as part of the goal establishment and emissions management plan development process.

This is the most stringent goal for all regions of the country. In regions with benchmark visibility conditions of 30 deciviews, achieving goal 4 would result in a 3 deciview improvement at the end of the first long-term strategy period. If such regions had natural visibility levels of 12 deciviews, achieving natural visibility conditions would result in 18 deciview improvements. With a 3 deciview improvement for each of 6, 10-year progress periods, such regions would achieve natural visibility conditions in 60 years.

The shorthand description of this goal is "**10% dv/10 years**."

3.3 Emissions Control Strategy Cases

Emissions control strategies are highly dependent on underlying emissions inventories, projection methodologies, air quality monitoring, and air quality modeling. The RIA uses an optimization methodology for selecting cost-effective control measures within a particular geographic region. Despite improvements in the underlying air quality monitoring and modeling information and adjustments for the limited transport of fugitive emissions, the control strategy selected an implausible amount of fugitive dust control. Without the time to further improve the

emissions inventory, projections, and air quality modeling, another emissions control strategy case was developed. Hence, there are two emissions control strategies: Case A and Case B. Both use the same optimization methodology.

3.3.1 Emissions Control Strategy Case A.

Emissions control strategy Case A is similar to that used in the economic analysis for the proposed RH rule. There is a cost-effectiveness cap of $1 billion per microgram per cubic meter reduction in fine particulate levels. However, the structure of the optimization model was improved to account for the visibility progress due to reductions in emissions of volatile organic compounds and directly emitted particulate matter. Data inputs to control strategy development were modified to include improved nitrogen oxides (N0x) control cost information acquired during the N0x State implementation plan (SIP) call rulemaking.

Like the analysis for the proposal package, the contribution of fugitive dust emissions to visibility impairment was adjusted to account for limited transport of such emissions.

3.3.2 Emissions Control Strategy Case B.

Emission control strategy Case B was developed to address the uncertainties related to fugitive dust emissions control measures. In emissions control strategy Case B, fugitive dust control measures are not considered in the application of the strategy optimization model.